

We Claim:

1. A method of cleaning small bore hollow tubing comprising
pressurizing a cleaning solution so as to infiltrate the cleaning
solution into the lumen of the tubing and

5 injecting a gas at high velocity into the center of the
tubing so as to form a two-phase flow through the hollow tubing
that loosens adhered materials from the walls of the tubing and
flushing the two-phase flow out of the tubing.

2. A method according to claim 1 wherein said hollow tubing is a
porous membrane.

3. A method according to claim 2 wherein said hollow tubing is a
hollow porous fiber.

4. A method according to claim 3 wherein a plurality of said
porous fibers are bundled together in a housing having an inlet
and an outlet.

5. A method according to claim 1 wherein the cleaning solution
has a pH of over 7.0.

6. A method according to claim 1 wherein the cleaning solution
has a pH within the range 11.3 to 12.8.

7. A method of cleaning a dialyzer comprising a plurality of permeable hollow fibers about 150-200 microns in diameter comprising adding a basic cleaning solution to said dialyzer to the lumen side of the fiber together with a flow of air under a
5 velocity that will form droplets of the solution, forcing the cleaning solution into the pores and removing contaminants from the lumen and pores of the fibers.

8. A method according to claim 7 wherein the cleaning solution has a pH of over 7.0.

9. A method according to claim 8 wherein the cleaning solution has a pH within the range 11.3 to 12.8.

10. A method according to claim 8 wherein said cleaning solution includes an agent that unclogs the pores.

11. A method according to claim 8 wherein said cleaning solution
15 comprises a surfactant.

12. A method according to claim 8 wherein said cleaning solution comprises a chelating agent.

13. A method according to claim 8 wherein two different solutions are passed into the hollow fibers sequentially.

14. A method according to claim 8 wherein a first solution of a blood unclotting agent is passed into said hollow fibers to dissolve blood clots prior to adding the two-phase cleaning solution.

5 15. A method of removing contaminants from a hemodialyzer comprising

backflushing the dialyzer membrane with a cleaning solution by pressurizing the solution from the dialysate side of the dialyzer,

forming a two-phase flow mixture by passing a gas into the lumen side of a plurality of porous hollow fibers and combining to form a mixed phase solution-gas mixture,

rinsing the dialyzer with water to remove said cleaning solution and contaminants, and

15 filling said dialyzer with a liquid sterilant.

16. A method according to claim 15 wherein the liquid to gas ratio of the two phase mixture is from 1:50 to about 1:6000.

17. A method according to claim 15 wherein the liquid used for backflushing and the liquid injected into the fiber lumens are
20 different.

18. A method according to claim 15 wherein the cleaning solution has a pH of over 7.0

19. A method according to claim 15 wherein the cleaning solution has a pH within the range 11.3 to 12.8.

5 20. A method according to claim 15 wherein cleaning is effective to remove middle solutes in dialysis patients.

21. An apparatus for cleaning hemodialyzers comprising

a two phase dialyzer re-processing tank having an inlet for aqueous cleaning solution and an inlet for compressed air;

an outlet for delivering a two phase flow of cleaning solution and air to a dialyzer to one or both of the lumen side and the dialysate side.

22. An apparatus according to claim 21 wherein the two phase flow is directed to the lumen side.

15 23. An apparatus according to claim 21 wherein the two phase flow is directed out of the dialyzer to a mist separator wherein the cleaning solution is separated from air.

24. An apparatus according to claim 21 wherein, after cleaning the dialyzer, it is rinsed with a mixture of water and air.